

### 3 Surface Data

Given a sampling interval of 12 data records per hour (i.e., 5-minute sampling time) times 24 hours per day over a four month period from June 1 through September 30 (122 days), a total of 35,136 data records per station were acquired and archived. These tower-based data include air temperature  $T$  ( $^{\circ}\text{C}$ ), relative humidity  $RH$  (%), scalar average wind speed  $S$  ( $\text{m s}^{-1}$ ), vector average wind speed  $U$  ( $\text{m s}^{-1}$ ), unit vector wind direction  $\theta$  (deg), and standard deviation of wind direction  $\sigma_{\theta}$  (deg). Note that  $\sigma_{\theta}$  was derived and logged by the Campbell Scientific CR10 data loggers using the Yamartino (1984) method. The data availability for each of these variables for each station is given in Table 2.

**Table 2.** Tower data availability.

ID	$T$	$RH$	$S$	$U$	$\theta$	$\sigma_{\theta}$
CAR	95.32	95.32	94.96	94.96	95.28	95.28
PBL	99.07	99.08	96.61	96.61	98.84	98.84
MKT	100.00	100.00	99.91	99.91	100.00	100.00
KET	92.85	92.86	92.36	92.36	92.84	92.84
GRN	98.76	98.76	97.86	97.86	98.73	98.73
SUI	100.00	100.00	99.78	99.78	100.00	100.00
REY	100.00	100.00	99.31	99.31	99.88	99.88
SHA	95.24	95.23	76.84	76.84	94.13	94.13
BEL	100.00	100.00	99.30	99.30	99.86	99.86

Overall, data availability was quite high for most stations. There are numerous reasons for missing data. They include the removable of spikes, outliers, and erroneous values through quality control screening, sensor failure (e.g., corroded cup anemometer bearings at the two coastal sites due to sea salt), the drop in battery voltage at night below a critical level needed to power the data logger and sensors, and phone line disruptions (e.g., discontinued service, lines cut by grass cutters and weed wackers). One interesting note was that the data logger used for the Piedras Blancas tower was accidentally reprogrammed by the Desert Research Institute (DRI). Two phone lines were installed at PBL prior to the start of the study. One line was assigned to FRD for the meteorology tower while the other was assigned to DRI for their air quality sensors. By coincidence, DRI also used the same Campbell Scientific data loggers. A DRI scientist mistakenly dialed the wrong phone number and downloaded their program into the FRD data logger. As a result, erroneous data was logged by the PBL tower. This problem was flagged within 24 hours and the tower data logger was properly reprogrammed. Because this mishap, all nine data loggers were password-protected to prevent accidental reprogramming.